CLAIMS

What is claimed is:

1. A print head of an ink-jet printer, comprising:

a main chip area having at least one ink jetting portion disposed on a substrate to jet ink, and at least one bonding pad connected with a corresponding lead end of a wiring of a circuit part to control the ink jetting portion; and

a scribe lane area disposed around the main chip area and forming a cutting region in which the main chip area is divided from main chip areas of other print heads by cutting, the scribe lane area having a damping pattern portion formed to be electrically and physically isolated from the main chip area and the substrate.

2. The print head according to claim 1, wherein the damping pattern portion comprises:

at least one insulating layer formed on the substrate; and

at least one reinforce pattern formed on the insulating layer.

3. The print head according to claim 2, wherein the at least one reinforce pattern comprises a plate formed in a predetermined shape and having a plurality of holes formed in a predetermined shape.

4. The print head according to claim 2, wherein the at least one reinforce pattern comprises a plurality of plates arranged in a predetermined position, each having a predetermined shape.

5. The print head according to claim 2, wherein the at least one reinforce pattern comprises a plate formed in a latticed shape.

6. The print head according to claim 2, wherein the at least one reinforce pattern is formed of a conductive material used to form lower wiring, and is arranged to be electrically insulated from the lower wiring.

7. The print head according to claim 6, wherein the conductive material is aluminum or aluminum alloy.

8. The print head according to claim 2, wherein the insulating layer comprises:

an isolation layer formed on the substrate; and

a first interlayer dielectric layer formed on the isolation layer.

9. The print head according to claim 8, wherein the first interlayer dielectric layer comprises an insulator film on the isolation layer.

10. The print head according to claim 9, wherein the insulator film is a thermal oxide.

11. The print head according to claim 2, wherein the reinforce pattern comprises two reinforce patterns formed to have an interlayer dielectric layer therebetween.

12. The print head according to claim 2, wherein the reinforce pattern is formed of the same material as the bonding pad.

13. The print head according to claim 2, wherein the damping pattern portion comprises at least one protection layer formed on the reinforce pattern.

14. The print head according to claim 13, wherein the protection layer comprises:

a passivation layer formed on the reinforce pattern; and

a chamber/nozzle plate layer formed on the passivation layer in the main chip area forming an ink chamber and a nozzle constituting the ink jetting portion.

15. The print head according to claim 1, wherein the damping pattern portion is disposed at both sides of the scribe lane area adjacent to a pad region of the main chip area in which the bonding pad is installed.

16. The print head according to claim 1, wherein the damping pattern portion is disposed at four sides of the scribe lane area.

17. The print head according to claim 1, wherein the lead end of the wiring is bonded with a sidewall of a recess formed on an upper surface of the bonding pad, to facilitate bonding with the bonding pad.

18. The print head according to claim 17, wherein the lead end of the wiring is bonded with the sidewall of the recess by piezoelectric bonding.

19. The print head according to claim 1, wherein the damping pattern portion is formed on various sides of the main chip area, to enhance mechanical strength and heat radiating capacity of the main chip area.

20. A fabrication method of a print head comprising:

forming a damping pattern portion in a scribe lane area to be electrically and physically isolated from a main chip area and a substrate.

21. The fabrication method according to claim 20, wherein the forming the damping pattern portion comprises:

forming at least one insulating layer in the scribe lane area; and

forming at least one reinforce pattern on the insulating layer.

22. The fabrication method according to claim 21, wherein the at least one reinforce pattern comprises a plate formed in a predetermined shape and having a plurality of holes formed in a predetermined shape.

23. The fabrication method according to claim 21, wherein the at least one reinforce pattern comprises a plurality of plates arranged in a predetermined position, each having a predetermined shape.

24. The fabrication method according to claim 21, wherein the at least one reinforce pattern comprises a plate formed in a latticed shape.

25. The fabrication method according to claim 21, wherein the forming the insulating layer comprises:

forming an isolation layer on the substrate; and

forming a first interlayer dielectric layer on the isolation layer.

26. The fabrication method according to claim 25, wherein the forming at least one reinforce pattern comprises:

forming a first reinforce pattern on the first interlayer dielectric layer;

forming a second interlayer dielectric layer over the substrate over which the first reinforce pattern is formed; and

forming a second reinforce pattern on the second interlayer dielectric layer.

27. The fabrication method according to claim 26, further comprising forming a bonding pad connected with a corresponding lead end of a wiring of a circuit part in the main chip area to control an ink jetting portion formed on the substrate to jet an ink, wherein the forming the at least one reinforce pattern is carried out together with the formation of the bonding pad.

28. The fabrication method according to claim 27, wherein the forming the first and second reinforce patterns further comprises:

depositing first and second metal layers, respectively, when forming the first and second reinforce patterns; and

patterning the first and second metal layers by using photo resists as masks.

29. The fabrication method according to claim 28, wherein the forming the bonding pad comprises forming a wide via hole in the second interlayer dielectric layer, after forming the second interlayer dielectric layer, to form a wide recess on an upper surface of the second metal layer forming a portion of the bonding pad.

30. The fabrication method according to claim 21, wherein the forming the damping pattern portion comprises forming at least one protection layer on the reinforce pattern.

31. The fabrication method according to claim 30, wherein the forming the protection layer comprises:

forming a passivation layer on the reinforce pattern; and

forming a chamber /nozzle plate layer on the passivation layer when the chamber/nozzle plate layer is formed in the main chip area to form an ink chamber and a nozzle constituting the ink jetting portion.

32. A head chip for an ink-jet printer, comprising:

a main chip area having at least one ink jetting portion disposed on a substrate; and

a damping portion on the outer area of the main chip area;

wherein the damping portion electrically and physically protects the head chip in the main chip area.

33. The head chip of claim 32, wherein the damping portion comprises:
at least one insulating layer formed on the substrate; and
at least one reinforce pattern formed on the insulating layer.

34. A head chip for an ink-jet printer, comprising:
a main chip area having at least one ink jetting portion disposed on a substrate; and
a damping portion on the outer area of the main chip area;
wherein the damping portion electrically insulates and mechanically reinforces an outer area of the head chip, preventing short circuits between the substrate and wire leads coming onto the head chip.

35. The head chip of claim 34, wherein the damping portion comprises:
at least one insulating layer formed on the substrate; and
at least one reinforce pattern formed on the insulating layer.

36. A head chip for an ink-jet printer, comprising:
a main chip area having at least one ink jetting portion disposed on a substrate; and
a damping portion on the outer area of the main chip area;
wherein the damping portion comprises metal, and efficiently removes heat generated from the main chip area during a printing process.